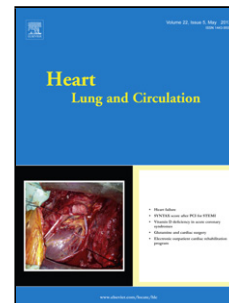


Accepted Manuscript

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PII: S1443-9506(14)00507-1
DOI: <http://dx.doi.org/doi:10.1016/j.hlc.2014.05.011>
Reference: HLC 1611

To appear in:

Received date: 31-12-2013
Revised date: 10-5-2014
Accepted date: 25-5-2014

Please cite this article as: Saireddy R, Lamana DA, Clarke A, Scalia GM, Raffel OC, Walters DL, Immediate Closure of Paravalvular Leak after Transcatheter Aortic Valve Implantation, *Heart, Lung and Circulation* (2014), <http://dx.doi.org/10.1016/j.hlc.2014.05.011>

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Title page

Title

Immediate Closure of Paravalvular Leak after Transcatheter Aortic Valve Implantation

Running head

Closure of Paravalvular Regurgitation

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Key words

Paravalvular, Amplatzer, TAVR

Manuscript

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Trans catheter aortic valve implantation (TAVI) is increasingly used to treat severe aortic stenosis (AS) in surgical high-risk groups. Mortality and reduction in symptoms were similar in the two groups[1]. Para valvular leak (PVL) was more common in the TAVI group[1] and is an independent predictor of mortality[1]. We report a case of successful immediate closure of moderate to severe PVL with an Amplatzer Vascular Plug III (AVP III).

A 75 year-old female presented with severe symptomatic AS. Logistic Euroscore was 35% and STS mortality score was 15%. The aortic annulus diameter by transthoracic echocardiogram was 22mm. CT reconstruction (3Mensio Medical Imaging BV, Netherlands) showed annulus perimeter of 76mm and area 438mm². There was significant calcium deposition at the annulus (Figure 1e). A 23mm Edwards Sapien XT valve (Edwards Lifesciences, Irvine, California) was chosen for TAVI. Due to tortuous and calcific ilio-femoral arteries, trans-aortic access was used for TAVI. Following valve implantation trans-oesophageal echocardiography (TEE) showed moderate to severe PVL (Figure 1a & 1c). Dilatation of the valve with a 45 x 25 mm Cristal balloon (BALT, France) failed to reduce PVL. Due to concern that the first valve was deployed too high another Sapien XT 23 mm valve was deployed more distally without any change to the PVL (Figure 2b). It was then decided to seal the PVL with AVP III. A JL4 catheter with a guidewire was used to cross the PVL after which a 6 Fr Cook sheath was used to deliver a 10mm x 5mm AVP III (St. Jude, St. Paul, Minnesota) to seal the PVL (Figures 2c & 2d). PVL was reduced to grade 0-1 (Figures 1c & 1d). A repeat TOE confirmed stable aortic valve prosthesis with mild PVL and preserved LV systolic function. Unfortunately, the patient died 14 days later after developing pneumonia and subsequent multi-organ failure.

Given the annular dimensions, ideally a 26mm valve is recommended. We used a 23mm valve due to significant focal calcification extending from annulus into LVOT. This meant high risk of

aortic root rupture with a 26mm valve[3]. Alternatively an underfilled 26mm valve could have been considered.

High or low implantation of the valve and inadequate apposition of the valve to the annulus either due to device annulus size mismatch, suboptimal balloon expansion (Edwards-Sapien) or significant localised calcium deposits are the predominant causes of PVL[2]. In the case described above, we took a stepwise approach to resolve PVL. As PVL is an independent marker of mortality in these patients, immediate PVL closure post TAVI should theoretically improve overall outcome in this group of patients. Long term follow up of a large cohort of patients with significant PVL undergoing PVL closure in the same setting will ultimately guide us in the right direction.

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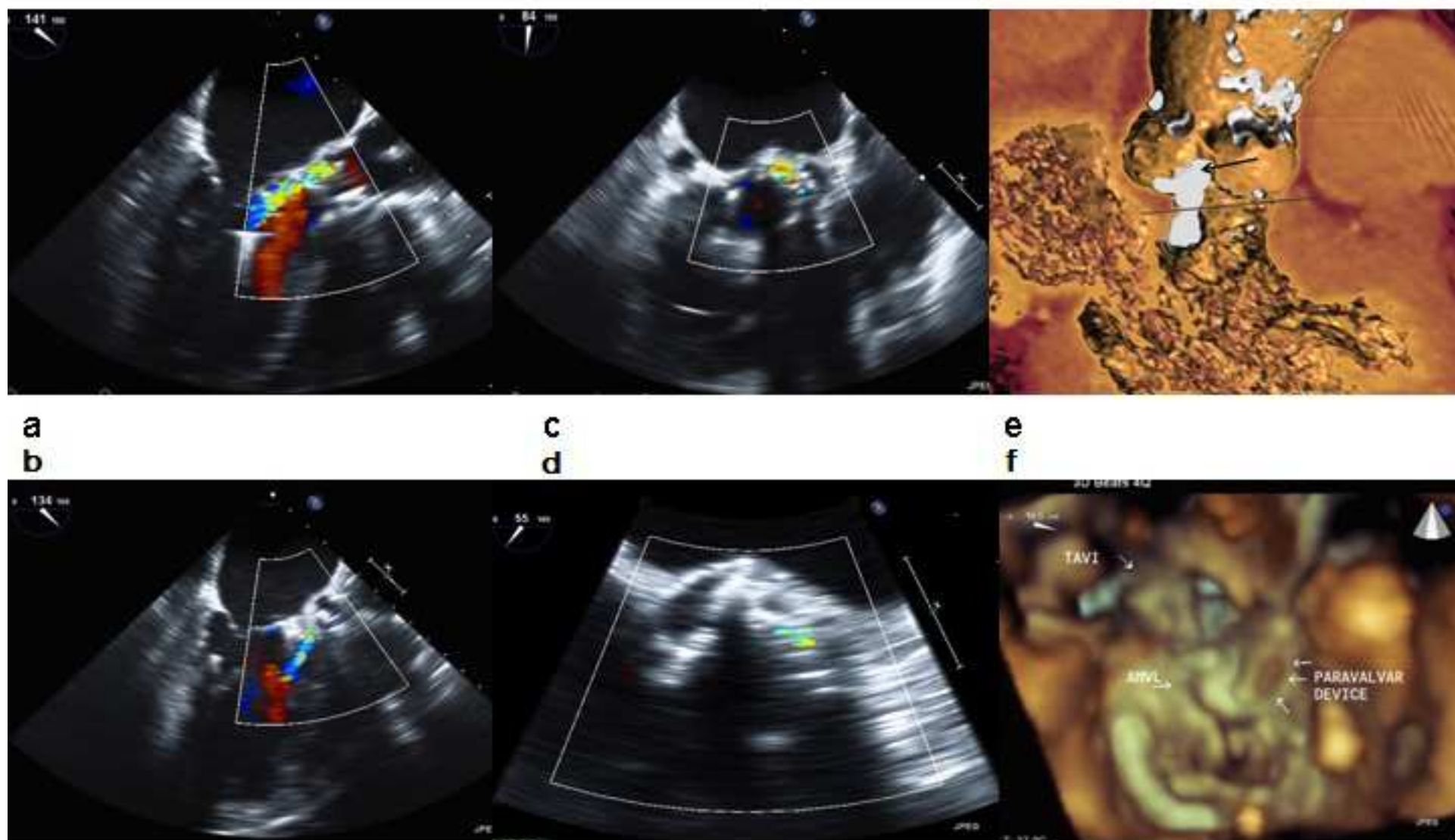
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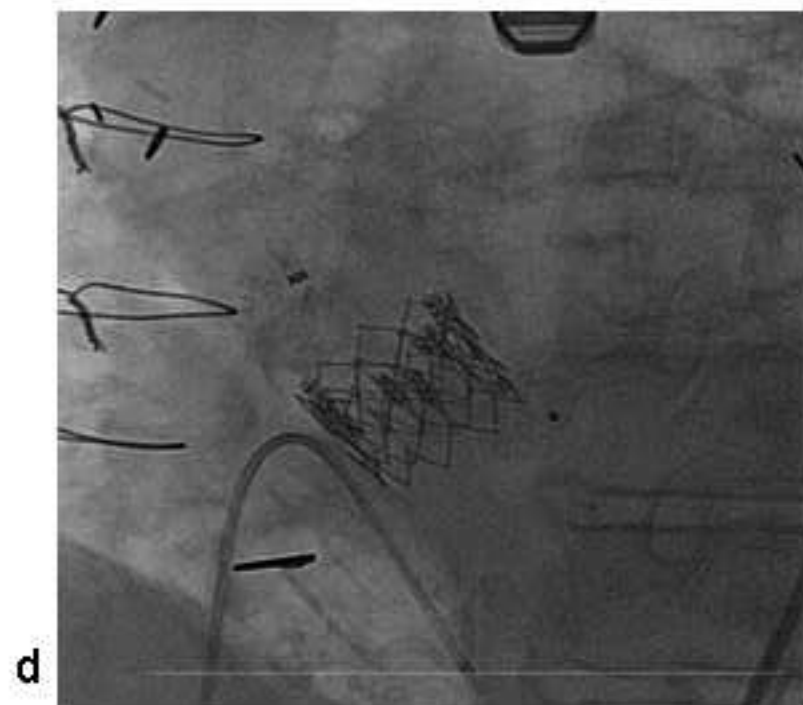
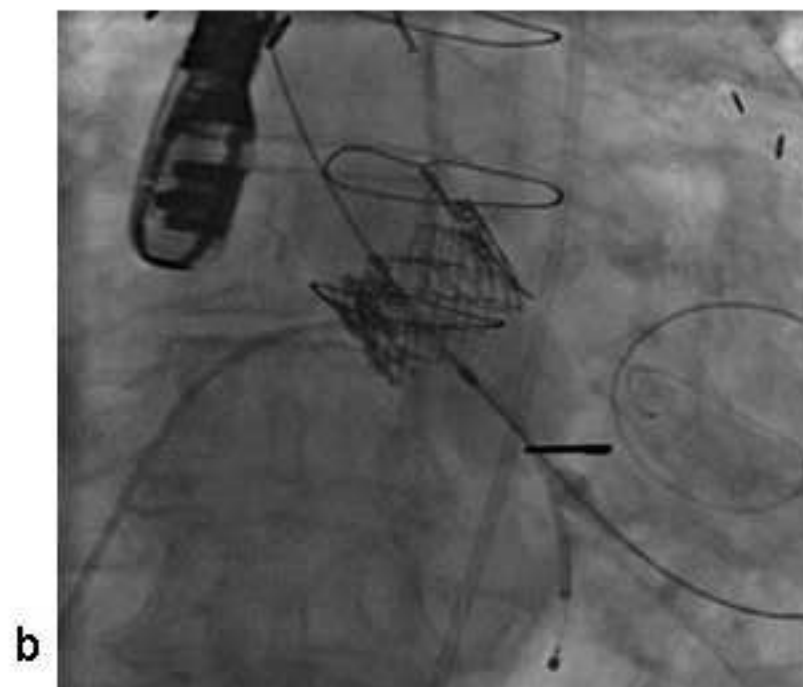
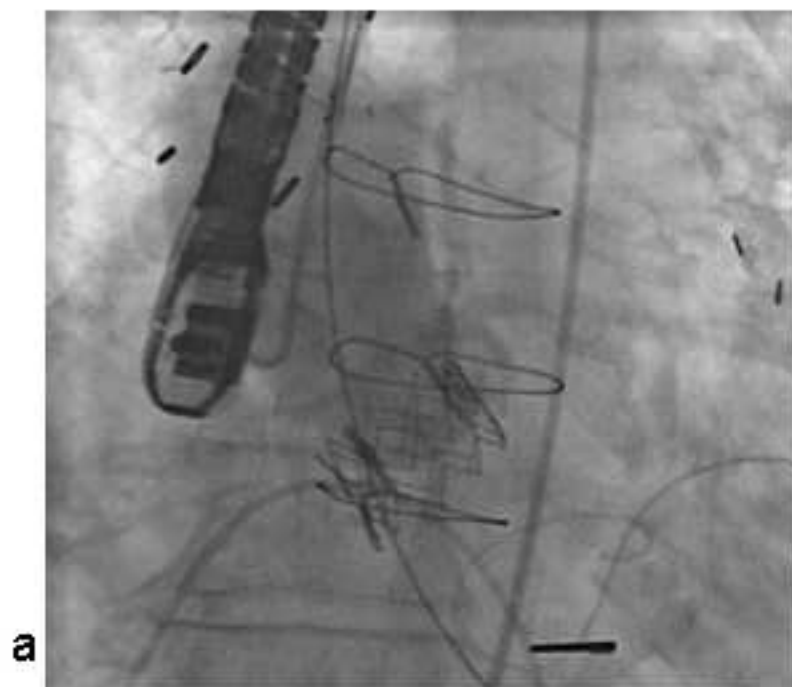
Figure legends

Figure 1: TEE Long axis and short axis views of PVL after TAVI (a & c respectively). Long and short axis views of PVL after AVP III implantation (b & d). 3D reconstruction (3 Mensio) showing a chunk of calcium (arrow) at the aortic annulus extending into LV (e). 3D TEE image showing relationship of the device to Mitral and Aortic valves (f).

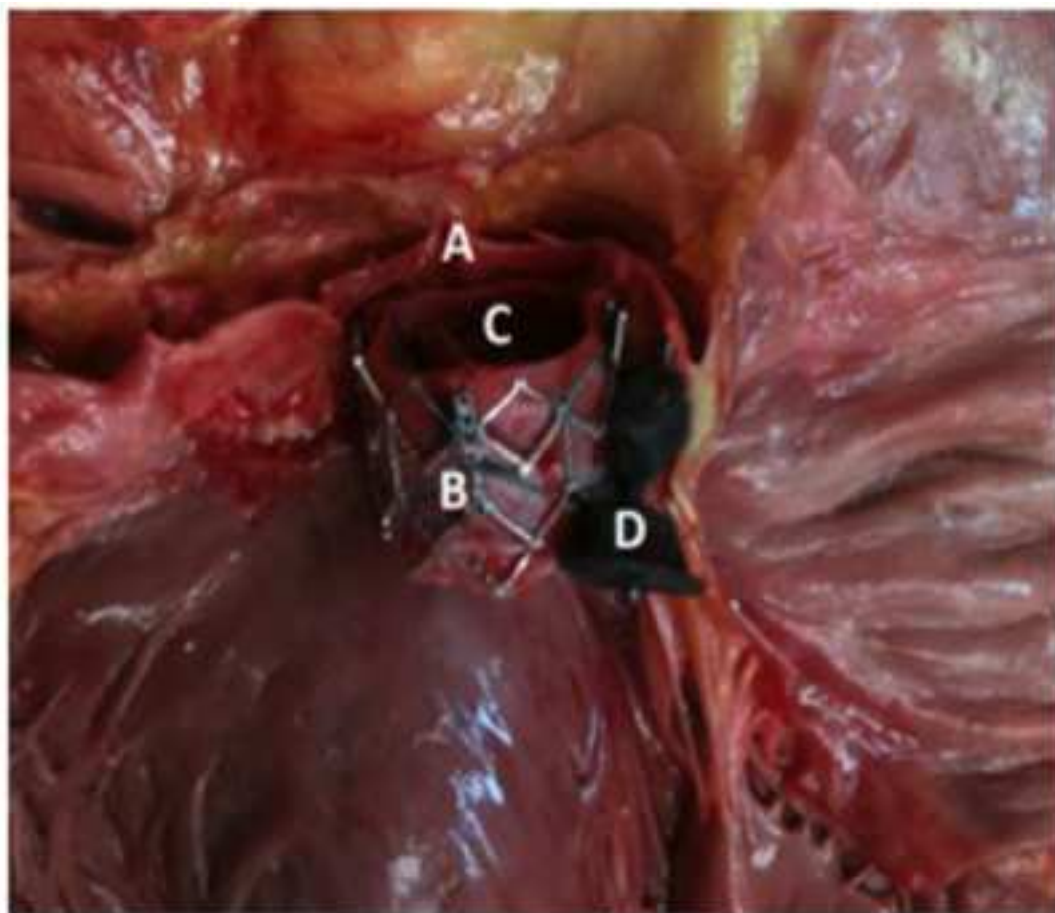
Figure 2: Aortogram after first Edwards valve implantation (a). Second Edwards valve deployed (b). AVP III implantation (c & d).

Figure 3: Post mortem images showing relationship of the valves and AVP III to native structures. Aortic valve cusp (A), first Edwards valve (B), second Edwards valve (C) and AVP III device (D).





a



b

